

# APPENDIX - Pipe Bending – MIL-STD-1627

USE ONE SHEET FOR EACH ITEM NUMBER

JOB NUMBER		PROJ. MGR.		QUOTE	
A) ORDER INFORMATION:					
CUSTOMER			CONTACT		
ADDRESS					
TELEPHONE		FAX		EMAIL	
PO NUMBER		PO DATE		DUE DATE	
JOB NAME/DESCRIPTION					
ITEM NO.	QUANTITY	DESCRIPTION			
DRAWINGS/DOCUMENTS PROVIDED					
STANDARDS TO MEET					
B) MATERIAL AND PRE-BENDING REQUIREMENTS:					
TYPE (SPEC)					
PIPE SIZE OR TUBE SIZE			WALL THICKNESS		
HEAT NUMBER			FURNISHED BY		
PROPER MATERIAL TYPE AND CONDITION SHALL BE CONFIRMED BEFORE USE AND TRACEABILITY MAINTAINED. MATERIAL SHALL BE CLEANED AS NECESSARY AND INSPECTED FOR ACCEPTABLE SURFACE CONDITION PRIOR TO USE.					
C) BENDING AND POST-BENDING PROCESS REQUIREMENTS:					
PART NUMBER/SPEC PER DRAWINGS NO.					
RADIUS			BENDING TEMPERATURE AMBIENT (COLD)		
LUBRICANT (IF ANY)			BENDING MACHINE ROTARY		
WHEN BENDING LONGITUDINALLY WELDED PIPES, THE WELD SHALL NOT BE LOCATED IN A PRINCIPAL AXIS. BEND ANGLE ADJUSTMENTS ARE LIMITED PER MIL-STD-1627C SECTION 5.6 (OPENING: ONCE $\leq 10^\circ$ , CLOSING: ANY). OUT-OF-ROUND AND BUCKLE, BULGE AND DENT CORRECTIONS ARE LIMITED PER MIL-STD-1627C PARAGRAPH 5.6.4.					
POST-BENDING HEAT TREATMENT					
FINAL CLEANING AND TREATMENT					
SPECIAL PACKAGING					
OTHER					

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<b>D) INSPECTION REQUIREMENTS:</b>	
BENDS SHALL BE VISUALLY AND DIMENSIONALLY INSPECTED ON A SAMPLE BASIS OF 100 PERCENT.	
VISUAL INSPECTION SHALL EXAMINE FOR ALL SURFACE CONDITIONS PER MIL-STD-1627C SECTION 5.9.1.	
DIMENSIONAL INSPECTION SHALL MEASURE BEND OUT-OF ROUNDNESS AND WALL THICKNESS: OUT-OF-ROUND MEASUREMENTS SHALL BE TAKEN WITH A CALIPER AT MID-BEND. WALL THICKNESS OF THE BACKWALL SHALL BE MEASURED WITH AN ULTRASONIC TESTER AT MID-BEND.	
EACH ITEM INSPECTED (SINGLE BEND OR MULTI-BEND PART) SHALL BE MEASURED BY VMM AND/OR CMM FOR BEND ANGLES, ROTATIONS AND RELATIVE POSITIONS OF BENDS, IN TERMS OF L-R-A (LENGTH-ROTATION-ANGLE) AND X-Y-Z DATA.	
OTHER	
<b>E) ACCEPTANCE CRITERIA:</b>	
VISUAL INSPECTION: NO CRACKS OR WRINKLES ALLOWED. ROUND BOTTOMED PITS, GOUGES, SCRATCHES AND TOOL MARKS ALLOWED IF NOT DEEPER THAN THE GREATER OF .010-INCH OR 5% NOMINAL WALL THICKNESS. GRADUAL BUCKLES, BULGES, HUMPS, STEPS AND DENTS ALLOWED IF NOT GREATER THAN 3% NOMINAL PIPE DIAMETER AND DISTANCE-TO-HEIGHT RATIO NOT LESS THAN 12:1 (FIGURE 3). FLATNESS SHALL MEET LIMITS OF FIGURE 4.	
OUT-OF-ROUNDNESS: AT THE BEND AS A PERCENTAGE OF NOMINAL DIAMETER = $\frac{D(MAX) - D(MIN)}{D(MAX) + D(MIN)} \times 200$ . LIMITS: 8% MAX. < 600-psi, 5% MAX. ≥ 600-psi WORKING PRESSURE.	
WALL THICKNESS: MINIMUM SPECIFIED DESIGN WALL THICKNESS REQUIRED THROUGHOUT PIPE LENGTH. BACKWALL THINNING SHALL NOT EXCEED 25% OF PRE-BENT WALL THICKNESS. MEASUREMENTS BY CALIBRATED ULTRASONIC TESTER SHALL BE TAKEN AT BACKWALL OF BEND AND AT LOCATIONS WHERE DEFECTS HAVE BEEN REMOVED.	
MINIMUM DESIGN WALL THICKNESS	BEND RADIUS TOLERANCE
LINEAR DISTANCE TOLERANCE	DEGREE OF BEND TOLERANCE
OTHER	
<b>F) DOCUMENTATION REQUIREMENTS:</b>	
RECORDS OF MATERIAL DOCUMENTATION, INCOMING INSPECTIONS, BENDING PROCESS NOTES, INSPECTION DATA, AND POST-BENDING PROCESSES SHALL BE MAINTAINED IN THE JOB RECORDS.	
THE JOB RECORDS SHALL BE MAINTAINED FOR (MINIMUM THREE YEARS)	YEARS AFTER DELIVERY OR THE END OF THE CONTRACT.
DOCUMENT IDENTIFICATION (CUSTOMER REQUIREMENTS)	
CERTIFICATIONS REQUIRED (CUSTOMER REQUIREMENTS)	
OTHER	
<b>G) OTHER REQUIREMENTS:</b>	